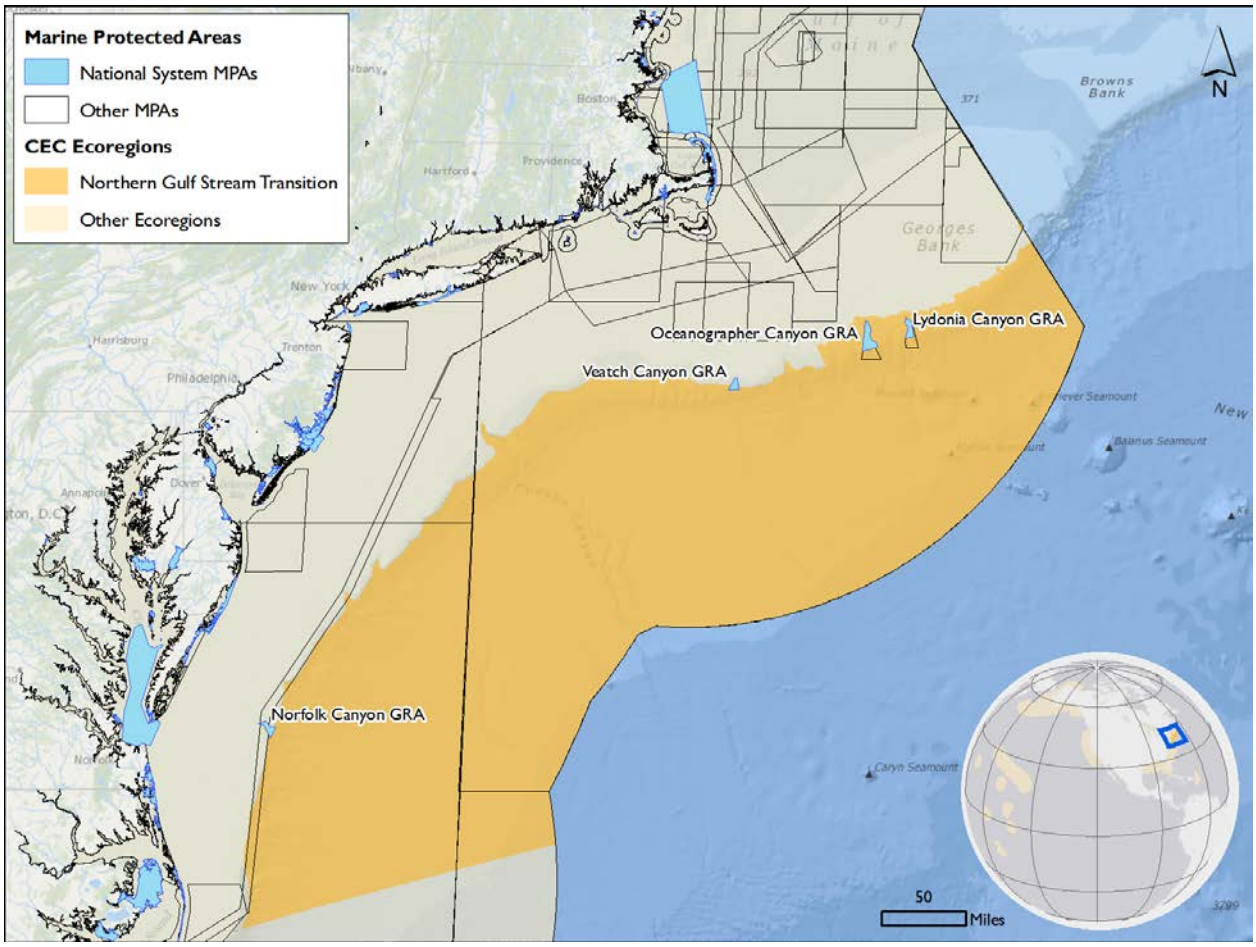
Northern Gulf Stream Transition (Ecoregion 9)

Background

The Northern Gulf Stream Transition Ecoregion is a region of open water that does not border any continental landmass and stretches east of North Carolina's Cape Hatteras northward to above the Grand Banks and Newfoundland. The ecoregion begins at the shelf break and extends seaward over several important deep sea formations such as canyons and seamounts. Its productivity results from the transition of water masses such as the Gulf Stream to the east, the Labrador Current to the north and west, and riverine flow from the Acadian and Virginian Ecoregions.



MPAs in the Northern Gulf Stream Transition

Of the 15 MPAs in the Northern Gulf Stream Transition Ecoregion, four (27%) are National System members and 11 (73%) are eligible but are not currently National System members (Figure 1). All 15 MPAs are managed by the NOAA Fisheries Service and are closed to fishing gear that harms bottom habitat. The four national system MPAs are all deepwater canyons that are closed to bottom trawling under the Tilefish Fishery Management Plan administered by NOAA Fisheries Service in cooperation with the Mid-Atlantic Fishery Management Council). Lydonia and Oceanographer Canyons are located off the south coast of Cape Cod, Veatch

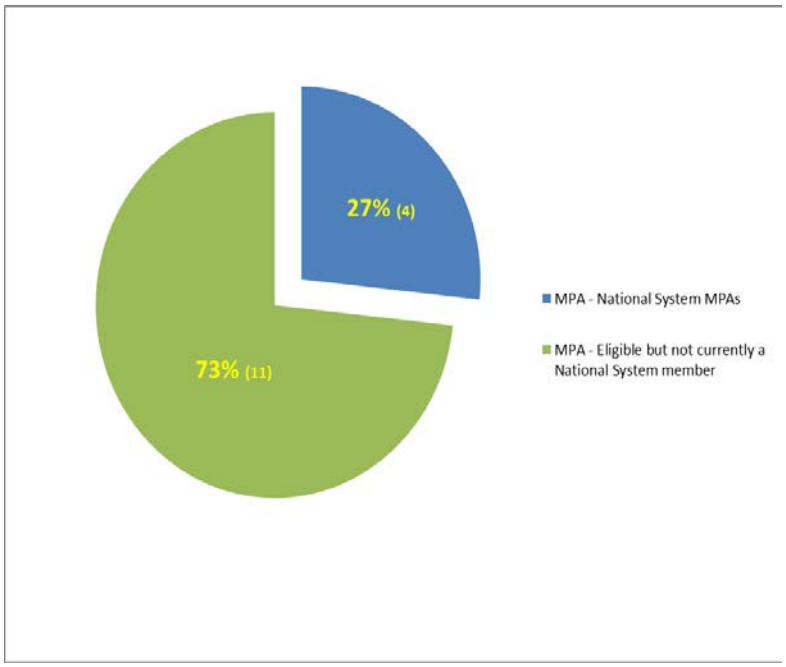


Figure 1. Percent of Marine Protected Areas(MPAs) within the Northern Gulf Stream Transition (Ecoregion 9) that are members of the National System of MPAs (n=15)

Canyon east of New Jersey, and Norfolk Canyon east of Virginia. These four MPAs are designated as Habitat Areas of Particular Concern (HAPCs), high priority areas for conservation, management, or research because they are rare, sensitive, stressed by development, or important to ecosystem function. These canyons all contain I coldwater corals (Figure 2). The other MPAs in this ecoregion are primarily focused on alleviating impacts of bottom trawling and other fishing gear on the benthic and epibenthic fauna of these

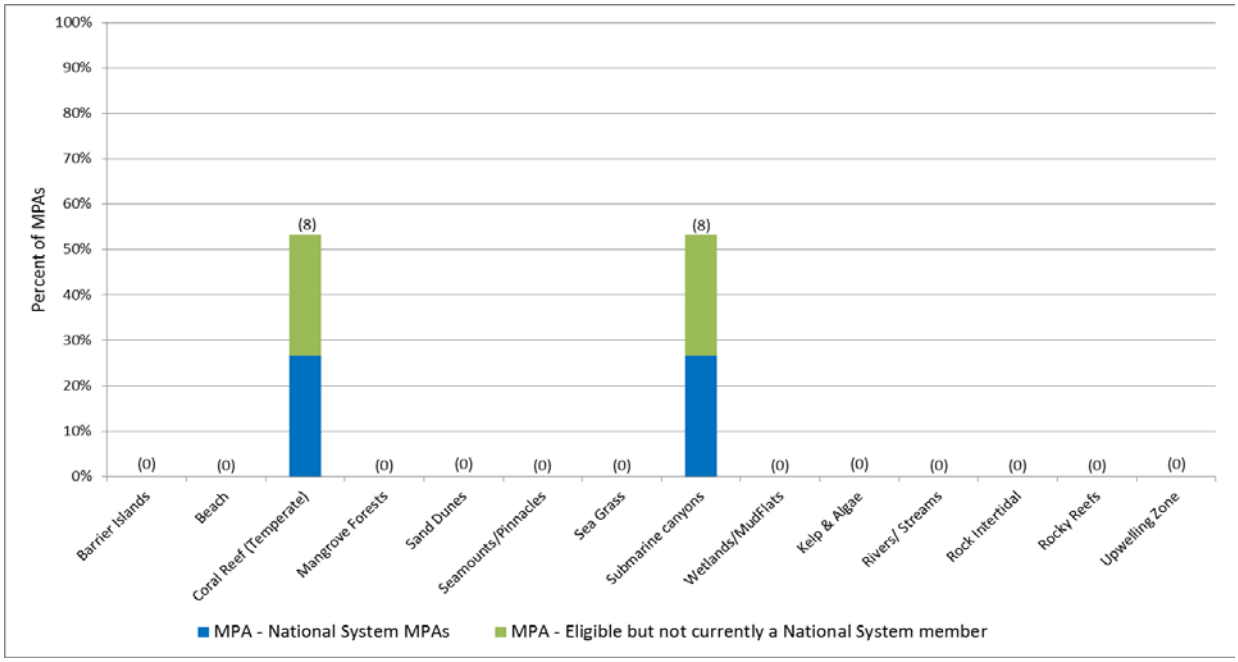


Figure 2. Percent of MPAs that contain certain habitat groups in the Northern Gulf Stream Transition (Ecoregion 9)

submarine canyon ecosystems and protecting coldwater corals. Ecologically important biogenic habitats found in other ecoregions such as seagrass, wetlands, mudflats, and kelp/algae and non-biogenic habitat such as rocky reefs and rocky intertidal are not found anywhere within this ecoregion, whether in MPAs or not, due to its offshore location (depths range from 200m – 3,000+m).

The mixing of cold (Labrador Current) and warm (Gulf Steam) water masses passing over important geologic features (e.g., seamounts, canyons) make the northeast canyon offshore areas rich in fisheries. Over 250 fish species have been recorded in this area, including important highly migratory species (found in over half of the MPAs) such as Bluefin tuna and white marlin. The ecoregion also supports internationally significant populations of marine mammals, including cetaceans (e.g., found in 60% of the ecoregion's MPAs) such as sperm whales that favor the deep and temperate waters. Anadromous and estuarine/ coastal fish migrate offshore from the east coast's rivers and streams during part of their life cycle, reported in approximately 13% and 27%, respectively, of the ecoregion's MPAs (Figure 3).

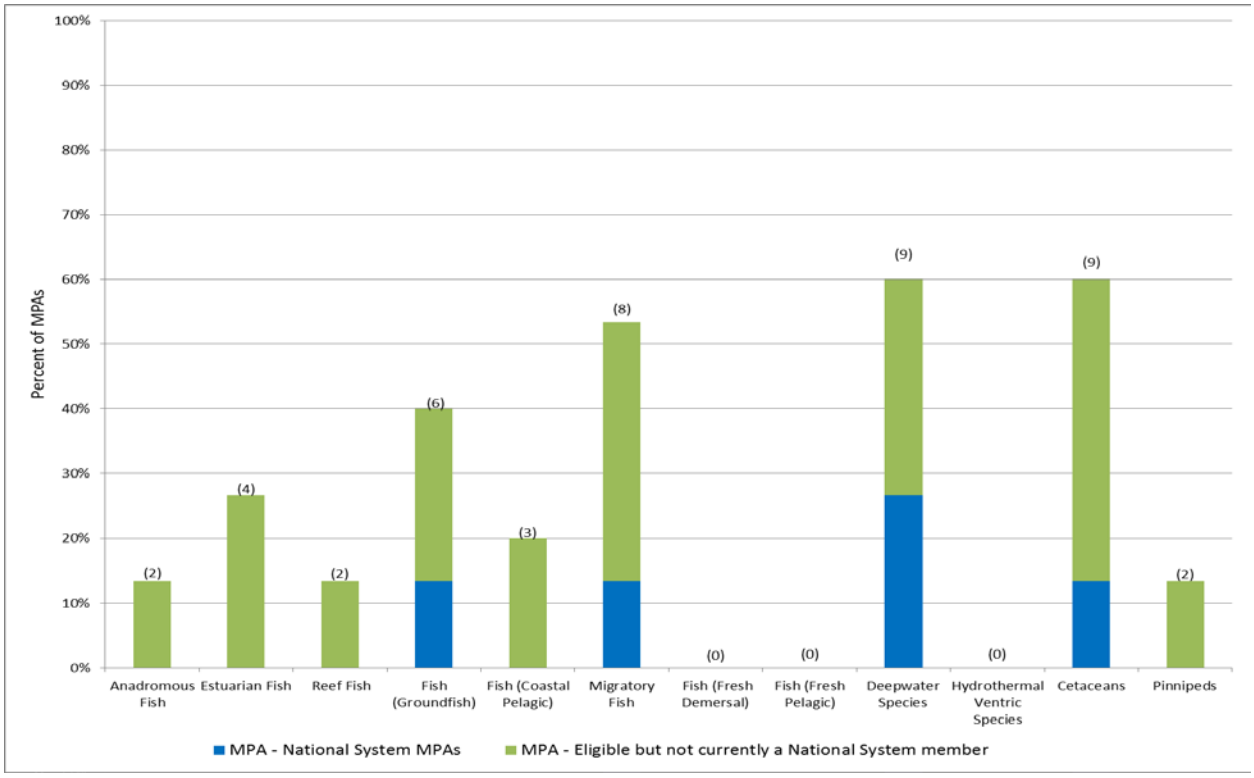


Figure 3. Percent of MPAs that contain certain fish and marine mammal groups in the Northern Gulf Stream Transition (Ecoregion 9)

Various types of marine fishes are found throughout many of the ecoregion's 15 MPAs, including coastal pelagic fishes in 20%, reef fish associated with coldwater corals (in 13%), and commercially important groundfish (in 40%).

Birds are classified as waterfowl, estuarine or seabirds, signifying where their principal feeding areas occur (e.g., seabirds, waterfowl, estuarine), and are found in 40%, 20%, and 20%, respectively, of the ecoregion's MPAs (Figure 4). Waterfowl from rivers and streams flowing into and near Chesapeake Bay likely migrate seaward as well. Birds not classified in any of these

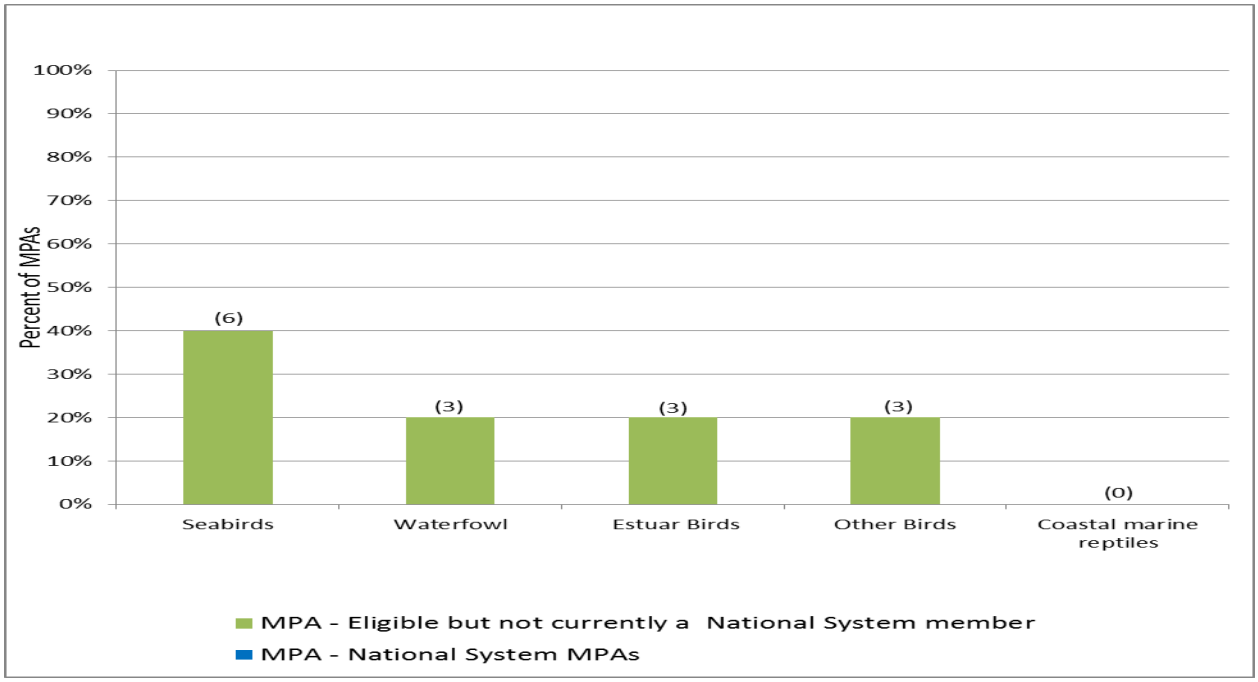


Figure 4. Percent of MPAs that contain marine birds in the Northern Gulf Stream Transition (Ecoregion 9)

feeding guilds are found in 20% of the ecoregion's MPAs.

Hydrocarbon seeps that occur within submarine canyons support distinct benthic invertebrate communities (e.g., found in 87% of the ecoregion's MPAs) capable of utilizing reduced chemical compounds for nutrition and accounting for a highly productive benthos (Figure 5). For

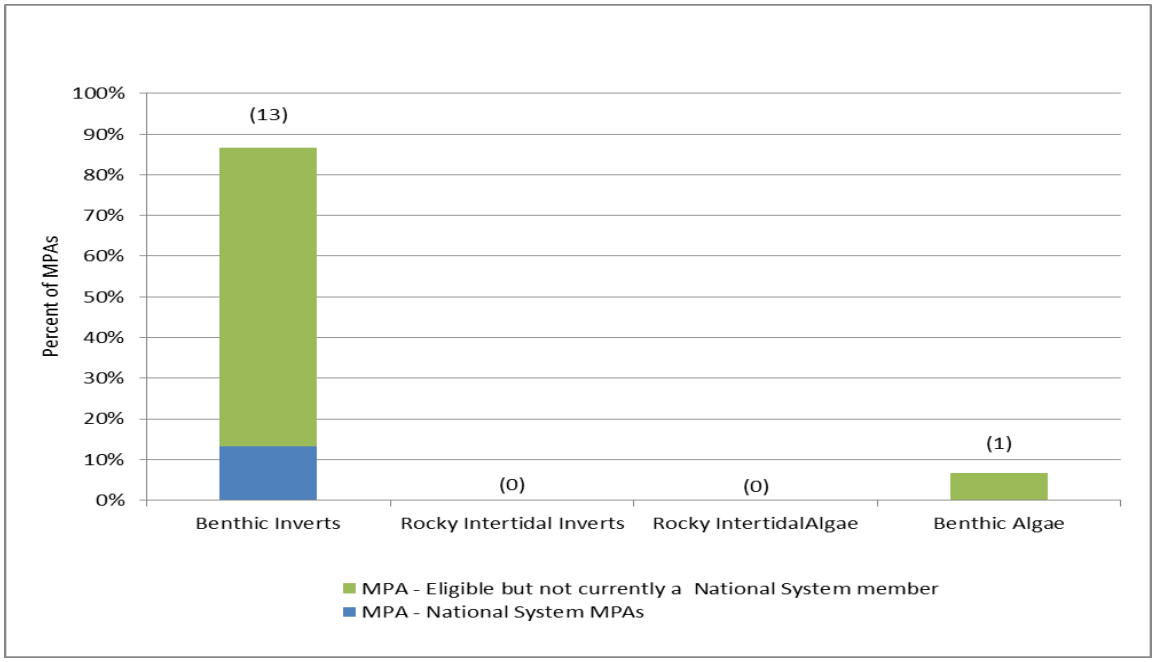


Figure 5. Percent of MPAs that contain benthic Invertebrates and algae in the Northern Gulf Stream Transition (Ecoregion 9)

instance, a newly discovered deep site near Norfolk Canyon (1600 m) exhibited extensive mussel beds and microbial mats. These mussel bed areas contain a greater proportion of crustaceans while microbial mats and slope communities were dominated by polychaetes.

Ecologically important areas that support where species breed, nest, spawn and rest can be found in some of the deepwater ecoregion's MPAs. These include coldwater corals and hydrocarbon seeps. The NOAA Fisheries Service has jurisdiction over 102 threatened and endangered species under the Endangered Species Act (ESA), many of which (such as sperm, fin, humpback and North Atlantic Right Whales as well as loggerhead and leatherback sea turtles are found in this ecoregion and in 73% of the ecoregions MPAs (Figure 6).

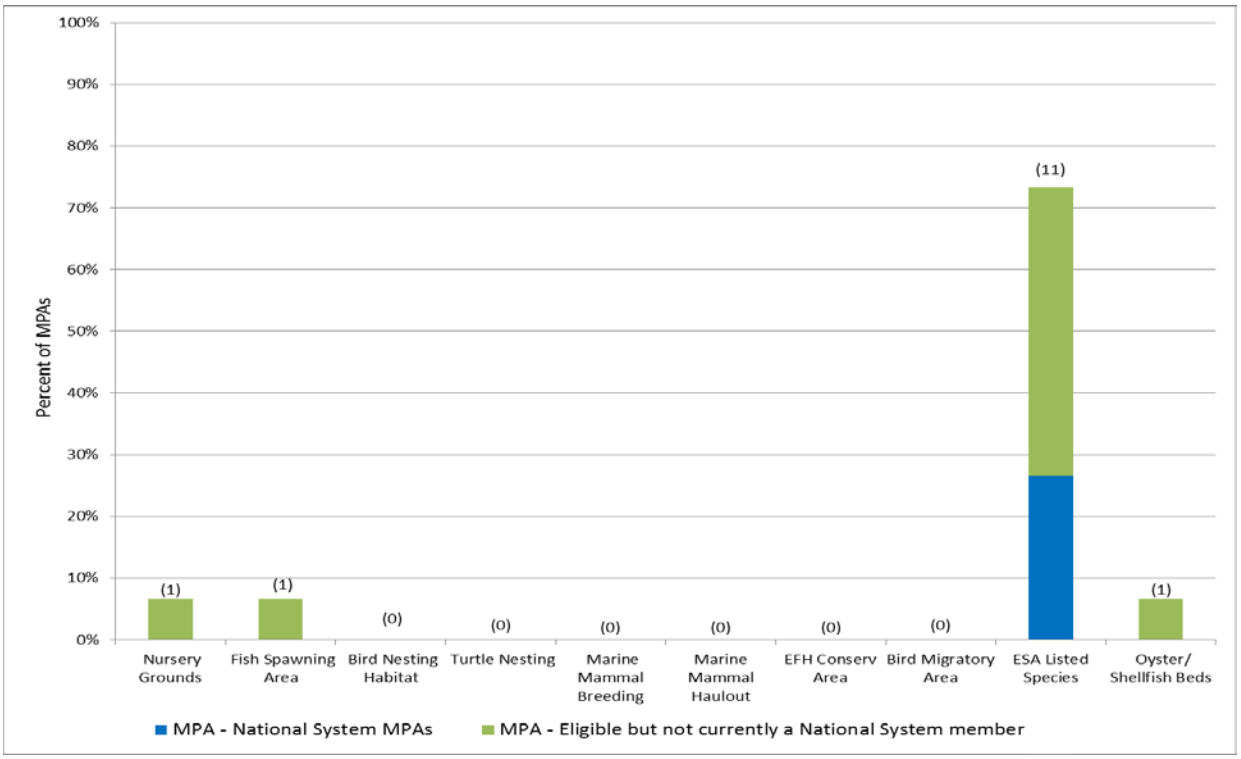


Figure 6. Percent of MPAs with ecologically important areas in the Northern Gulf Stream Transition (Ecoregion 9)

Conclusions

The 15 MPAs in this ecoregion contain the major habitat and species groups and ecologically important areas found in the ecoregion as a whole. In some cases, these resources are also found in more than one MPA, resulting in some replication of ecological features (species, habitats and ecological processes) -- one of the criteria identified by the Convention on Biological Diversity (CBD) in designing effective MPA networks. Ecologically important use groups (e.g., nursery grounds, fish spawning area, oyster/shellfish beds) are only listed as present in one MPA in the ecoregion, lacking this CBD replication criterion.

Suggested Reading

Valentine, C., J.R. Uzmann and R.A. Cooper. 1980. Geology and biology of Oceanographer submarine Canyon. *Marine Geology* 38:(4):283-312